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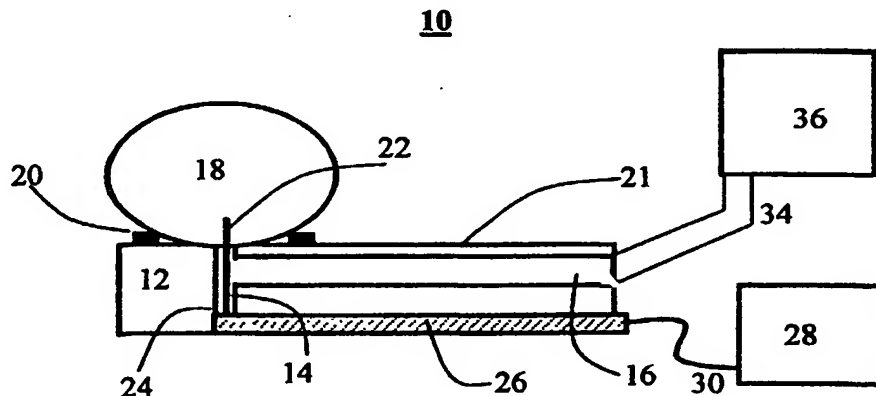
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(54) Title: **SYSTEM FOR AND METHOD OF POSITIONING CELLS AND DETERMINING CELLULAR ACTIVITY THEREOF**



(side view)

(57) Abstract: A device for positioning at least one cell in at least one addressable position, the device comprising a substrate (12) formed with at least one addressable pore (14) and at least one channel (16) embedded in the substrate and being held in fluid communication with the at least one pore. The at least one pore and the at least one channel are designed and constructed such that an under-pressure formed in the at least one channel results in vacuum adherence of the at least one cell onto the at least one pore, such that a single cell is vacuum adhered onto a single pore. In one embodiment, the substrate is a non-conductive substrate and is further formed with one or more electrode structures (22), where each of the electrode structures is positioned in one of the pores. In an additional embodiment the device is designed to be locatable on an organ, such as the brain.